Stat 350: Lab 4

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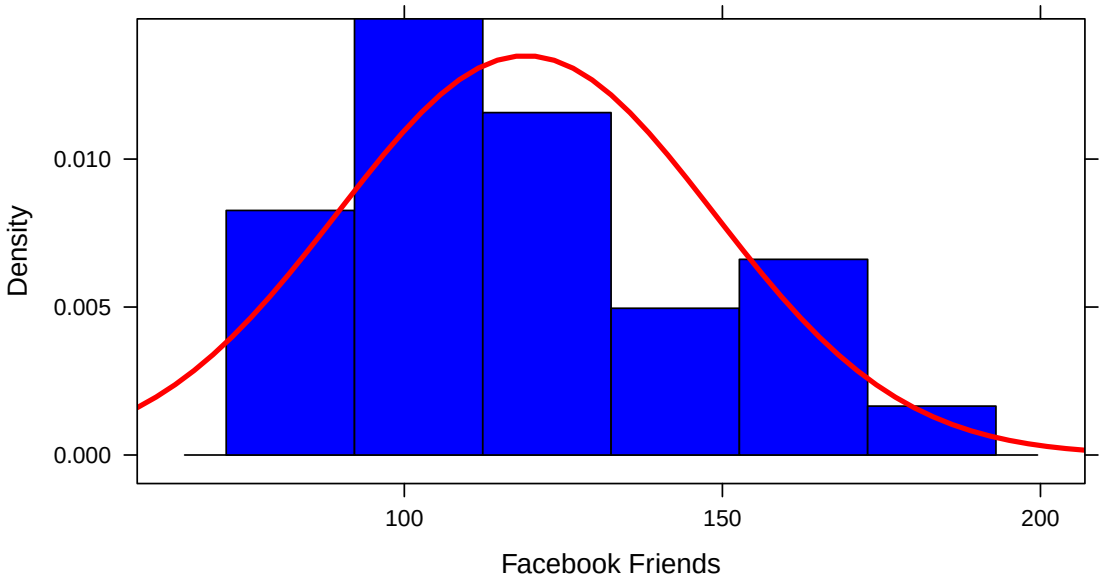
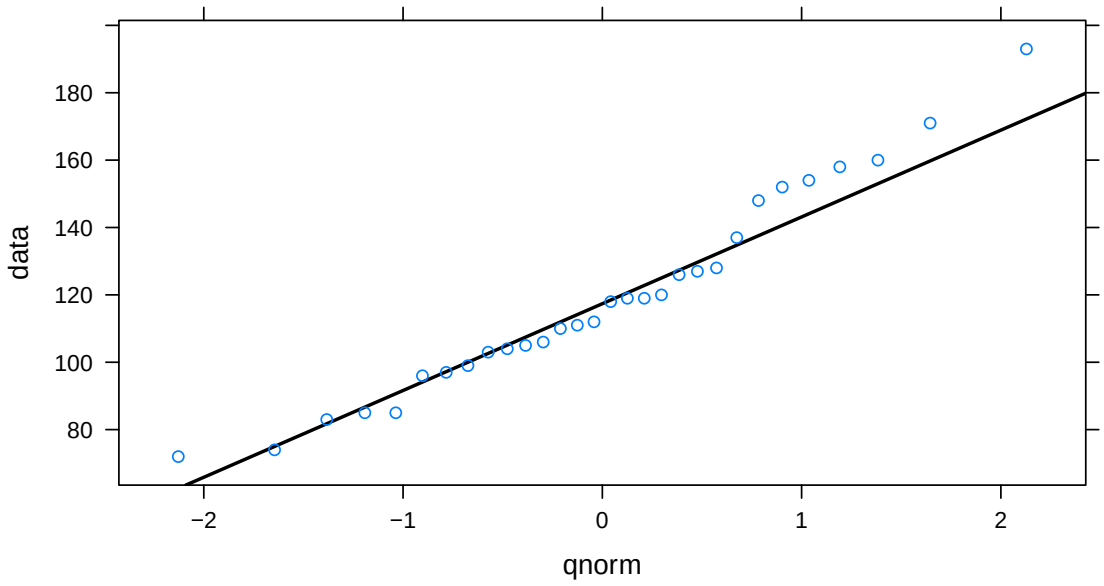
A. Number of Friends on Facebook

1. Power of Test Given Parameters

The graphs below show roughly normal behavior... TODO EXPAND





2. Appropriateness of T-Test

Yes because normal TODO EXPAND

3. Calculating Confidence Interval - By Hand

Critical Value (α): 2.0452296
Sample Mean ($\bar{x}$): 119.0666667
Standard Deviation (σ): 29.5669122
Standard Error: 5.3981549
Margin of Error: 11.0404665
Confidence Interval: $[108.0262002, 130.1071331]$

```
a <- qt(.975, length(fb_data$Friends)-1)
x_bar <- mean(fb_data$Friends)
std <- sd(fb_data$Friends)
stderr <- std / sqrt(length(fb_data$Friends))
marg_error <- a * stderr
conf_int <- c(x_bar-marg_error, x_bar+marg_error)
```

4. Calculating Confidence Interval - Via Software

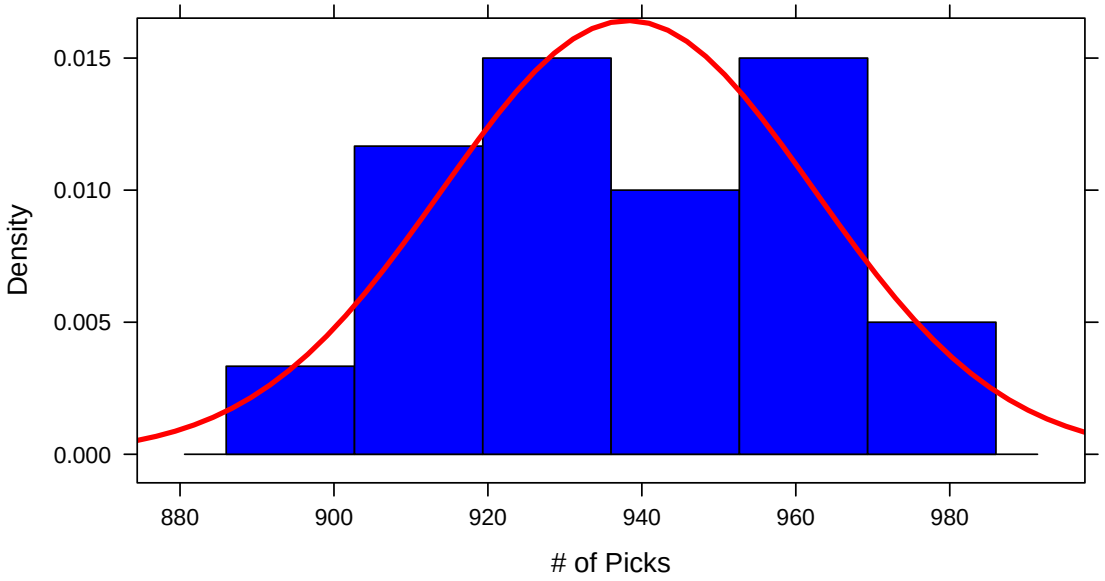
```
t.test(fb_data$Friends,conf.level=0.95, mu=130)

##
##  One Sample t-test
##
## data:  fb_data$Friends
## t = -2.0254, df = 29, p-value = 0.05212
## alternative hypothesis: true mean is not equal to 130
## 95 percent confidence interval:
##  108.0262 130.1071
## sample estimates:
## mean of x
##  119.0667
```

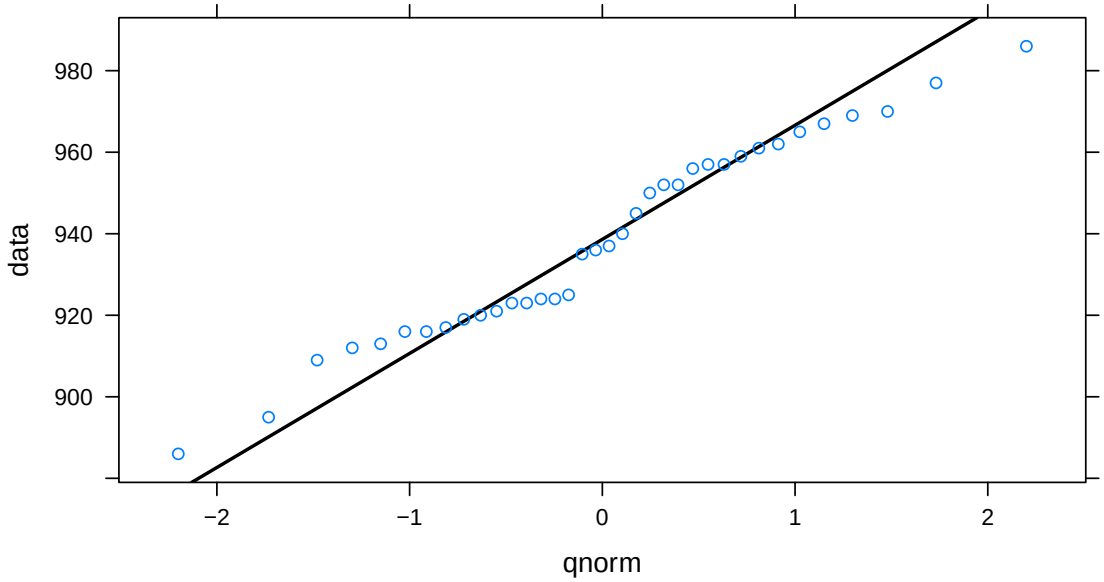
5. Interpretation

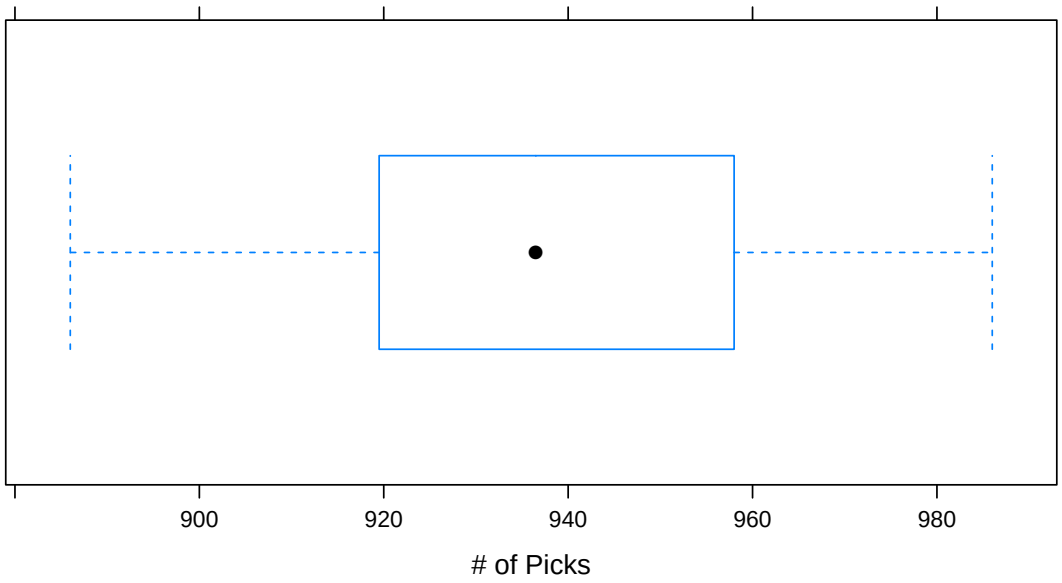
TODO

B. Picks in a 1-lb bag

1. Plots of the Data


0.015
0.010
0.005
0.000
Density
880
900
920
940
960
980
# of Picks


980
960
940
920
900
data
−2
−1
0
1
2
qnorm



2. Distribution

Blahblah todo

3. Appropriateness of T-Test

Yes because normal TODO EXPAND

4. Requested Values

Sample Mean ($\bar{x}$): 938.2222222
Standard Deviation (σ): 24.2971028
Standard Error: 4.0495171

5. Lower Confidence Bound

Margin of Error: 8.2209569
95% Lower Confidence Bound: 930.0012654

6. Testing $\mu > 925$

1. $H_0 : \mu = 925$
   $H_a : \mu > 925$
2. $t_t = 3.2651355$
   $DF = 35$
3. P-Value = 0.0012251
4. $\alpha = 0.05$ and P-Value $\leq \alpha$ $(0.0012251 \leq 0.05)$
   $\implies H_0$ is rejected

7. Testing $\mu > 935$

1. $H_0 : \mu = 935$
   $H_a : \mu > 935$
2. $t_t = 0.7957053$
   $DF = 35$
3. $P - Value = 0.2157835$
4. $\alpha = 0.05$ and P-Value $\not\leq \alpha$ ($0.2157835 \not\leq 0.05$)
   $\implies$ Not sufficient evidence to reject H_0.

8. Comparison

Code

```
library(lattice)
library(xtable)
my_qqwithline <- function(data, title = NULL) {
    qqmath(data, panel = function(x) {
        panel.qqmathline(x, distribution = qnorm, lwd = 2)
        panel.qqmath(x)
    }, main = title)
}
my_histogram <- function(x, avg, std, ...) {
    histogram(x, panel = function(x) {
        panel.histogram(x, breaks = NULL, ...)
        panel.mathdensity(dmath = dnorm, col = "red", args = list(mean = avg,
            sd = std), lwd = 3)
    }, type = "density", ...)
}
fb_data <- read.table("facebookfriends.txt", header = TRUE)
pick_data <- read.table("pickcount.txt", header = TRUE)
my_histogram(fb_data$Friends, mean(fb_data$Friends), sd(fb_data$Friends), col = "Blue",
    xlab = "Facebook Friends")
my_qqwithline(fb_data$Friends)
a <- qt(0.975, length(fb_data$Friends) - 1)
x_bar <- mean(fb_data$Friends)
std <- sd(fb_data$Friends)
stderr <- std/sqrt(length(fb_data$Friends))
marg_error <- a * stderr
conf_int <- c(x_bar - marg_error, x_bar + marg_error)
```